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SHORT REPORT

Infected Endograft with Aorto-duodenal Fistula Following Endovascular Repair of Abdominal Aortic Aneurysm

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Abdominal aortic aneurysm;
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Abstract *Introduction:* Endograft infection with the development of an aorto-duodenal fistula is a rare long-term complication following endovascular abdominal aortic aneurysm repair (EVAR).
Report: We report the case of an endograft infection with aorto-duodenal fistula nine months after uncomplicated EVAR of an infra-renal abdominal aortic aneurysm (AAA). The 74-year-old man underwent graft explantation and insertion of a Rifampicin-soaked graft. The patient died eight days after the procedure from anastomotic rupture.
Discussion: This case illustrates the need for continued awareness of potential graft infection following EVAR and the importance of prompt diagnosis. We discuss the technical problems of explantation of endografts. We reiterate the need for sterility at EVAR procedure and propose the use of prophylactic antibiotics during primary interventions.

Introduction

Endograft infection with an aorto-duodenal fistula is a rare long-term complication of endovascular aneurysm repair (EVAR). There are sporadic case reports, however, difficulties remain in ensuring prompt diagnosis and determining the optimum treatment strategy.[1]

Case report

A 74-year-old man admitted with large bowel obstruction was incidentally found to have an abdominal aortic aneurysm. He underwent an emergency Hartmann's procedure with formation of a mucous fistula for an obstructing Dukes C carcinoma of the sigmoid from which he made an uneventful recovery.

Contrast Computerised Tomography (CT) showed a 6.6 cm infra-renal aneurysm with a left common iliac aneurysm suitable for EVAR for which he underwent six weeks later. A bifurcated aorto-iliac stent graft (Zenith, Cook®) was deployed uneventfully. The left internal iliac artery was

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occluded with a 12 mm amplatz plug and the left limb was extended into the external iliac artery. Prophylactic antibiotics were given peri-operatively (Flucloxacillin and Gentamicin). The post-procedural completion angiography showed the exclusion of the AAA with the patency of the renal and iliac arteries in absence of sign of endoleak. Follow-up CT at 3 and 6 months revealed no evidence of infection.

Nine months following EVAR he presented with haematemesis and sepsis. His abdomen was soft but generally tender. Blood tests demonstrated a white cell count of 16.8×10^9/l, C-reaction protein of 210 mmol/l and haemoglobin of 8.6 g/dl. Upper gastrointestinal endoscopy to the second part of the duodenum revealed two small benign looking ulcers on the lesser curve of the stomach. A CT angiogram (Fig. 1) confirmed an endograft infection. He received 5 units of red blood cells, and empirical intravenous antibiotic therapy (Tazocin (Piperacillin and Tazobactam), Metronidazole and Gentamicin) and was urgently referred to our vascular unit, undergoing surgery 12 h later.

At laparotomy, an aorto-duodenal fistula was identified between the fourth part of the duodenum and the aneurysm sac (Fig. 2). This was taken down and the defect closed with interrupted 2/0 Maxon sutures. Following 5000 IU heparin, both external iliac arteries and the right internal iliac artery were controlled. Supra-renal control of the aorta was gained as was control of the superior mesenteric artery and both renal arteries. The sac was opened revealing a large amount of purulent fluid which was drained, and cultured *Enterococcus* and *Escherichia coli*. The endograft was easily pulled out of the iliac arteries; however removal of the proximal end required pinching in of the uncovered stent to release the hooks from the aortic wall. Caudal tension released the graft along with significant atheroma essentially performing an endarterectomy (Fig. 3). Following thorough irrigation a Rifampicin soaked 18-mm Dacron tube-graft (Vascutek®) was sutured to a thin walled infra-renal neck using a standard technique. An aorto-bi-femoral graft was undesirable as his colostomy and mucous fistula gave him a high risk of infection; he was not a fit enough candidate for a reverse vein graft. The aneurysm sac appeared uninfected at presentation and so was closed over the graft; an omental flap was used to further separate the sac from the duodenum.

Post-operatively, intravenous antibiotics (Meropenem, Metronidazole and Gentamicin) were given appropriate to both blood and endograft culture sensitivities and initially the patient recovered well. On day 8 when discharge planning was being contemplated, his anastomosis ruptured and attempts at resuscitation were unsuccessful.

Figure 1 Contrast CT angiogram revealing a bifurcated stent graft in position with gas pockets within the aneurysm sac (arrow) and peri-aortic soft tissue thickening and stranding confirming an endograft infection.

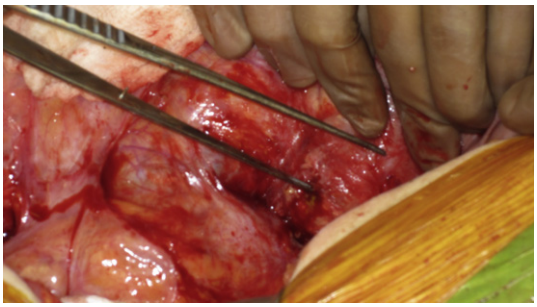

Figure 2 Demonstration of the fistula in the fourth part of the duodenum.

Discussion

There have recently been a growing number of reports concerning endograft infections although the risk of infection is still very low. The incidence of primary endograft infection is about 0.2% compared to approximately 0.4% following open repair.[2] Endograft infections presenting with an aorto-duodenal fistula are rarer but carry a much higher mortality rate.[1]

The pathophysiology is most likely related to an initial graft infection which leads to fistula formation from graft to duodenum.[3] In this case, contamination from the skin around the groin incision at the initial operation is a possible source of infection, particularly in view of the fact that he had a left iliac fossa end colostomy and a mucous fistula at the distal end of his laparotomy wound, although no groin wound infection was documented following the initial EVAR procedure. In hindsight a prolonged course of antibiotics after the original procedure may have been beneficial to reduce the risk of potential infection further.

The management is similar to open aortic graft infections. The only curative treatment is complete explantation of the infected endograft. No definitive conclusions have been drawn regarding optimal surgical treatment. Evidence supports in situ replacement (aortic-bi-iliac or bi-femoral graft) over extra-anatomical bypass.[4] The cause of the rupture of the anastomosis so soon following surgery is unclear. The presence of infection played a major role and

Figure 3 Explanted infected endograft revealing large cuff of atheroma at the proximal end.

complete resection of the aneurysm sac may have decreased this risk, although at presentation it appeared uninfected. The thin walled although healthy infra-renal neck of the aorta also created a potential weaker anastomosis and may have contributed to the fatal outcome.

In conclusion this report emphasises the need for continued awareness of potential graft infection in patients having EVAR. We reiterate the need for meticulous sterile technique during EVAR and the use of prophylactic antibiotics during the primary intervention, which is standard practice in our institution. The optimal surgical treatment for revascularisation remains uncertain.

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None declared.

References

1 Laser A, Baker N, Rectenwald J, Eliason JL, Criado-Pallares E, Upchurch GR Jr. Graft infection after endovascular abdominal aortic aneurysm repair. J Vasc Surg, in press. Corrected Proof, Available online 2 February 2011.

2 Moll FL, Powell JT, Fraedrich G, Verzini F, Haulon S, Waltham M, et al. Management of abdominal aortic aneurysms clinical practice guidelines of the European society for vascular surgery. *Eur J Vasc Endovasc Surg* 2011;**41**(Suppl. 1):S1—58.

3 Saratzis N, Saratzis A, Melas N, Ktenidis K, Kiskinis D. Aortoduodenal fistulas after endovascular stent-graft repair of abdominal aortic aneurysms: single-center experience and review of the literature. *J Endovasc Ther* 2008;**15**(4):441—8 [Review].

4 Setacci C, De Donato G, Setacci F, Chisci E, Perulli A, Galzerano G, et al. Management of abdominal endograft infection. *J Cardiovasc Surg (Torino* 2010;**51**(1):33—41.